What is Claimed is:

1. A method of forming an optical fiber preform, the method comprising::

providing a consolidated glass preform precursor body having an outer surface;

depositing a layer of silica soot onto the outer surface of the consolidated glass preform precursor body to form a composite preform comprised of a consolidated glass portion and a silica soot portion; and

in a deuterium-exposing step, exposing the composite preform to an atmosphere containing a concentration of a deuterium compound for a time and at a temperature sufficient to cause the deuterium compound to penetrate the consolidated glass portion without pervading the entire glass portion.

2. The method of Claim 1 wherein the depositing step further comprises causing a hydrogen compound to penetrate the consolidated glass preform precursor body.

3. The method of Claim 2 wherein at least a portion of the hydrogen compound in the consolidated glass preform precursor body is exchanged with at least a portion of the deuterium compound.

4. The method of Claim 1 further comprising, after the depositing step, exposing the composite preform to a chlorine-compound-containing atmosphere.

5. The method of Claim 4 wherein the chlorine-compound-containing atmosphere comprises an inert gas.

6. The method of Claim 4 wherein, the composite preform is exposed to a chlorine-compound-containing atmosphere prior to the deuterium-exposing step.

7. The method of Claim 4 wherein the composite preform is exposed to a purge atmosphere comprising an inert gas prior to the deuterium-exposing step.

8. The method of Claim 4 wherein the composite preform is exposed to a chlorine-compound-containing atmosphere, and then the composite preform is exposed to a purge atmosphere comprising an inert gas, prior to the deuterium-exposing step.

9. The method of Claim 4 wherein the composite preform is exposed to a purge atmosphere comprising an inert gas after the deuterium-exposing step.

10. The method of Claim 4 wherein the composite preform is exposed to a chlorine-compound-containing atmosphere after the deuterium-exposing step.

11. The method of Claim 4 wherein, after the deuterium-exposing step, the composite preform is exposed to a purge atmosphere comprising an inert gas, and then the composite preform is exposed to a chlorine-compound-containing atmosphere.

12. The method of Claim 1 further comprising consolidating the silica soot portion to form a second consolidated glass preform precursor body comprised of the glass portion and a second glass portion formed from the silica soot portion.

13. The method of Claim 12 further comprising repeating the depositing step and the deuterium-exposing step.

14. The method of Claim 13 further comprising heating and drawing the second consolidated glass preform precursor body to a reduced diameter prior to depositing silica soot thereon.

15. The method of Claim 1 wherein the deuterium compound penetrates the glass portion to a desired depth.

16. The method of Claim 1 wherein the consolidated glass preform precursor body is generally cylindrical about a centerline axis, wherein at least a portion of the consolidated glass preform precursor body has a radial thickness RC1 measured from the centerline axis, and wherein less than 0.1 ppm of any deuterium compound is present at radii less than about 0.25 RC1.

17. The method of Claim 1 wherein less than 0.1 ppm deuterium compound is formed by the reaction of deuterium with the consolidated glass portion at radii less than about one-fourth the radius of the consolidated glass preform precursor body.

18. The method of Claim 16 wherein less than 0.1 ppm of the deuterium compound is present at radii less than about 0.5 RC1.

19. The method of Claim 16 wherein less than 0.1 ppm of the deuterium compound is present at radii less than about 0.75 RC1.

20. An optical fiber preform made in accordance with the method of Claim 1.